FICTITIOUS DOMAIN METHODS TO THE DIRECT NUMERICAL SIMULATION OF THE LIFTING OF ELLIPSOIDS IN THE INCOMPRESSIBLE VISCOUS FLUID

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In this talk, we discuss the distributed Lagrange multiplier (DLM)/fictitious domain methods for the direct numerical simulation of the interaction between incompressible viscous fluid and the rigid bodies of general shape, which are moved by the hydrodynamical forces and gravity. We will focus on the lifting of the ellipsoids and the migration of the neutrally buoyant particles in a pressure driven Poiseuille flow in a pipe. For the cases where the particles are neutrally buoyant, a methodology which can handle the difficulties from the DLM approach is presented. We conclude this talk by the presentation of the results of various numerical experiments in two and three dimensions.

References

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[2] T.-W. Pan, R. Glowinski, Direct simulation of the motion of neutrally buoyant circular cylinders in plane Poiseuille flow, J. Comput. Phys., 181 (2002), pp. 260-279.